UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,741	06/23/2005	Jonas Samuelsson	915-008.037	2915

4955 7590 01/06/2009

WARE FRESSOLA VAN DER SLUYS & ADOLPHSON, LLP
BRADFORD GREEN, BUILDING 5
755 MAIN STREET, P O BOX 224
MONROE, CT 06468

EXAMINER	
SHAH, PARAS D	
ART UNIT	PAPER NUMBER
2626	

MAIL DATE	DELIVERY MODE
01/06/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/540,741	SAMUELSSON ET AL.	
	Examiner	Art Unit	
	PARAS SHAH	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 October 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21,26 and 32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21,26 and 32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This communication is in response to the Amendments and Arguments filed on 10/27/2008. Claims 1-21, 26, and 32 remain pending, with claim 32 newly added, where all claims have been examined. The Applicants' amendment and remarks have been carefully considered, but they do not place the claims in condition for allowance.

2. All previous objections and rejections directed to the Applicant's disclosure and claims not discussed in this Office Action have been withdrawn by the Examiner.

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/27/2008 has been entered.

Response to Arguments

4. Applicant's arguments (pages 7-11) filed on 10/27/2008 with regard to claims 1-21, 26, and 32 have been fully considered and are persuasive. However, upon further consideration, a new reference was applied.

Claim Objections

5. Claim 14 is objected to because of the following informalities: Claim 14 should be dependent upon claim 6, which recites the estimation of background noise energy as "relative noise energy" and " noise spectrum tilt". Appropriate correction is required.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. Claims 15 and 32 are rejected under 35 U.S.C. 101 because the claims appear to be directed to a software embodiment and not to a hardware embodiment, where a machine claim is directed towards a system, apparatus, or arrangement. The claim appears to be directed towards a software embodiment. The Applicant's Specification does not provide support that such components are performed by physical or structural components pertaining to hardware. Such components that are claimed are capable of being software only. In paragraph [0087], of the published application, reference to noise dependent filtering can be implemented as a module for use in electronics.

Claims 16-21 are rejected as being dependent upon a rejected base claim.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1-5, 7, 8, 10-12, 15-18, 20, 21, 26 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ojala (US 6,584,441).

As to claims 1 and 26, Ojala teaches a method comprising:

providing a filter suited for reduction of distortion (see Figure 6, post-filter 808, and col. 7, lines 56-57, post-filtering is weakened on certain frames), including quantization noise (e.g. it is obvious that such noise is included in background noise), caused by speech coding of a speech signal (see col. 7, lines 15-16, decode speech); estimating background acoustic noise in said speech signal (see col. 8, lines 19-21, estimate of background noise); adapting said filter in response to the estimated background acoustic noise to obtain an adapted filter (see col. 7, lines 56-65 where weighting factors of the filter are changed based on the background noise, and col. 8, lines 10-15, where the weighting can change based on background noise); and applying said adapted filter to said speech signal so as to reduce background acoustic noise and to reduce distortion, including quantization noise, caused by speech coding in said speech signal (see Figure 6, output of postfilter 809, results in filtered output and col. 7, lines 18-20).

However, Ojala does not specifically teach the quantization noise.

It would have been obvious to one of ordinary skilled in the art at the time the invention was made to have modified the postfilter of Ojala with the use of

quantization noise, where background noise as taught by Ojala includes all forms of noise (see col. 11, lines 57-60).

As to claims 2 and 16, Ojala teaches wherein said adapting said filter involves adjusting filter coefficients of said filter (see col. 7, lines 63-65, where weighting factors of the filter are adjusted and results in different filter coefficients).

As to claims 3 and 17, Ojala teaches wherein said estimating, adapting and applying are performed for portions of said speech signal which contain speech as well as for portions which do not contain speech (see col. 7, lines 56-65, where for depending on the frame type weighting factors are adjusted and applied and see col. 9, lines 5-7, strong postfiltering performed).

As to claims 4 and 18, Ojala teaches wherein said filter includes a short-term filter function (see col. 7, lines 41-42) designed for attenuation between spectrum formant peaks of said speech signal (see col. 7, lines 41-42, equation 5 and col. 4, lines 44-56, resonance peaks are postfiltered and the factors lambda1 and lambda2 regulate strength of the postfiltering) wherein said filter coefficients include at least one coefficient that controls the frequency response of said short-term filter function (see col. 4, lines 54-59, where the factors a determine the short-term spectrum).

As to claim 5, Ojala teaches wherein said filter includes a spectrum tilt compensation function (see col. 4, lines 58 and equation 6, tilt factor)and wherein said filter coefficients include at least one coefficient that controls said spectrum tilt compensation function (see col. 4, lines 55-65, mu).

As to claims 7 and 20, Ojala teaches wherein said adapting is performed by selecting values for said filter coefficients from a lookup table, which maps a plurality of values of estimated background acoustic noise to a plurality of filter coefficient values (see col. 7, lines 60-35 and col. 8, lines 11-14, where a 10dB reduction maps to a 0.05 weighting factor increase depending on background noise and the table is shown in col. 7, lines 51-54) (e.g. Since the postfilter controller changes weights of the filter it would be obvious that such filter also changes the weights in response to the background noise as cited above in col. 8).

As to claim 8, Ojala teaches wherein said estimating, adapting and applying are performed after decoding said speech signal (see col. 7, lines 15-20, where the decoded signal is input into the postfilter).

As to claims 10 and 21, Ojala teaches wherein said speech signal comprises speech frames and wherein said estimating, adapting and applying are performed on a frame-by-frame basis (see col. 7, lines 56-65, frame based estimation, applying and adapting).

As to claims 11, Ojala teaches wherein further comprising initially generating said lookup table by: adding different artificial noise power spectra having given parameter (s) of background acoustic noise to different clean speech power spectra (see col. 8, lines 6-13, reduction for speech coding can be done with listening tests); optimizing a predetermined distortion measure by applying said filter (see col. 8, lines 10-14, where filter weights are adjusted by using a relationship between weights based on SNR) to different combinations of clean speech power spectra and artificial noise power spectral (see col. 8, lines 6-14, testing based on listening) ; and for said different combinations, saving in said lookup table those filter coefficient values, for which said predetermined distortion measure is optimal, together with corresponding value (s) of said given parameter (s) of background acoustic noise (see col. 8, lines 6-14, where a relationship for each 10dB reduction, where the weighting factor increases by a 0.05).

As to claims 12, Ojala teaches wherein said predetermined distortion measure includes spectral distortion (see col. 8, lines 10-14, where a reduction of 10dB reduction in SNR from an increase in background noise).

As to claims 15 and 32, Ojala teaches wherein an apparatus comprising:

a filter configured for reduction of distortion, including quantization noise, caused by speech coding of a speech signal (see Figure 6, postfilter 808 and see col. 6, lines 24-28 and in a decoding system, see col. 7, lines 4)

a noise estimator configured for estimating background acoustic noise in said speech signal (see col. 7, lines 61, background noise detection and see col. 8, lines 19-21, estimate of background noise determined); and a

a postfilter controller (see col. 7, lines 64, postfilter control 805) configured for adapting said filter in response to the estimated background acoustic noise, wherein said filter, when applied to said speech signal reduces background acoustic noise and reduces distortion, including quantization noise, caused by speech coding in said speech signal (see col. 7, lines 56-65 where weighting factors of the filter are changed based on the background noise, and col. 8, lines 10-15, where the weighting can change based on background noise);.

However, Ojala does not specifically teach the quantization noise.

It would have been obvious to one of ordinary skilled in the art at the time the invention was made to have modified the postfilter of Ojala with the use of quantization noise, where background noise as taught by Ojala includes all forms of noise (see col. 11, lines 57-60).

10. Claims 6 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ojala in view of Gao (US 6,959,274).

As to claims 6 and 19, Ojala teaches all of the limitations as in claim 1, above.

Furthermore, Ojala teaches wherein the background noise in said speech signal is estimated as relative noise energy (see col. 8, lines 20, estimate of background noise strength).

However, Ojala does not specifically teach the noise spectrum tilt.

Gao does teach the background noise in speech signal is estimated as noise spectrum tilt (see col. 14, lines 21).

It would have been obvious to one of ordinary skilled in the art at the time the invention was made to have modified the postfiltering as taught by Ojala with the noise spectrum tilt as taught by Gao for the purpose of improving quality of speech (See Gao, col. 2, lines 45-46).

As to claims 13, Ojala teaches Ojala teaches all of the limitations as in claim 1, above.

Furthermore, Ojala teaches wherein the background noise in said speech signal is estimated as relative noise energy (see col. 8, lines 20, estimate of background noise strength).

However, Ojala does not specifically teach the noise spectrum tilt.

Gao does teach the background noise in speech signal is estimated as noise spectrum tilt (see col. 14, lines 21).

It would have been obvious to one of ordinary skilled in the art at the time the invention was made to have modified the postfiltering as taught by Ojala with the

noise spectrum tilt as taught by Gao for the purpose of improving quality of speech (See Gao, col. 2, lines 45-46).

11. Claims 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ojala in view of Gao (US 6,959,274), as applied in claim 6, above, And further in view of Eatwell et al. (US 5,768,473), hereinafter Eatwell.

As to claim 16, Ojala in view of Gao teaches all of the limitations as in claim 6, above.

Furthermore, Ojala teaches wherein the background noise in said speech signal is estimated as relative noise energy (see col. 8, lines 20, estimate of background noise strength).

Furthermore, Gao does teach the background noise in speech signal is estimated as noise spectrum tilt (see col. 14, lines 21).

However, Ojala in view of Gao do not specifically teach the deciding whether the estimated relative noise energy for a current speech frame is below a predetermined threshold; and if so, not performing said adapting filter coefficients and applying said filter, and instead per-forming energy attenuation on the current speech frame so as to suppress background acoustic noise in a speech pause.

Eatwell does teach the deciding whether the estimated relative noise energy for a current speech frame (see col. 4, lines 29, where the noise estimate is made) is below a predetermined threshold (see col. 5, lines 9-18, where the SNR is evaluated and a gain modified for low and high SNR in order to solve the problem in col. 4,

lines 61-63); and if so, not performing said adapting filter coefficients and applying said filter, and instead per-forming energy attenuation on the current speech frame so as to suppress background acoustic noise in a speech pause (see col. 5, lines 61-36, where the signal spectrum is modified (entire) by applying modified gains).

It would have been obvious to one of ordinary skilled in the art at the time the invention was made to have modified the postfiltering as taught by Ojala in view of Gao with the attenuation of noise energy during a speech pause as taught by Eatwell for the purpose of improving quality of speech (See Eatwell, col. 1, lines 10-11).

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to PARAS SHAH whose telephone number is (571)270-1650. The examiner can normally be reached on MON.-THURS. 7:00a.m.-4:00p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on (571)272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Paras Shah/
Examiner, Art Unit 2626

12/23/2008

/Patrick N. Edouard/
Supervisory Patent Examiner, Art Unit 2626